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| MARSHALL, GERSTEIN & BORUN 6300 SEARS TOWER 233 SOUTH WACKER CHICAGO, IL 60606-6357 | | | EXAMINER | |
| | | | STAICOVICI, STEFAN | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-------------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/754,486 | TEMPLE ET AL. |
| | Examiner Stefan Staicovici | Art Unit 1732 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 09 May 2003.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 9, 23-25, 31 and 34-35 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. _____.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____.

2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

6) Other: _____

DETAILED ACTION

Response to Amendment

1. Applicants' amendment filed May 9, 2003 (Paper No. 10) has been entered. Claims 23 and 31 have been amended. No claims have been canceled. No claims have been added. Claims 9, 23-25, 31 and 34-35 are pending in the instant application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 9, 31 and 34-35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 31, line 2, the newly added limitation of "a nozzle plate substrate" does not appear to have support in the original disclosure. Although the original disclosure does have support for "a nozzle plate substrate" as a workpiece the original disclosure does not have support for an apparatus that includes the workpiece, *i.e.*, a nozzle plate substrate, as a component of said apparatus. It should be noted that an apparatus that includes a workpiece as a component is a "kit," and a kit is not being claimed in the instant application.

In claim 9, the limitation that the beam is “inverted” and directed “along an axis collinear with said first axis” by reflecting the beam off a “planar reflecting surface” and a “further beam reflecting means” is not clear to one ordinarily skilled in the art. According to Figure 5a and the original specification at page 12, line 12 through page 13, line 25, it appears that inversion of the laser beam can occur only when reflecting the laser beam off three reflecting surfaces. Further, it should be noted that inversion of the beam could not occur when using *only two* (emphasis added) reflecting surfaces. Further clarification is required. Claims 34-35 are rejected as dependent claims.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 9, 23-24 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiwaki *et al.* (US Patent No.5,263,250) in view of Shei *et al.* (US Patent No. 5,569,238).

Nishiwaki *et al.* ('250) teach the basic claimed apparatus and process for forming nozzles in a nozzle plate for an inkjet print head including, splitting a laser beam (3) into a plurality of secondary beams using a system of prisms and a flyeye lens (4), hence introducing a divergence into the secondary beams, whereas the origin of divergence being apart from the point where beam splitting occurs (see Figure 2), followed by a process of recombining and directing the

secondary beams, using a convergent lens, toward a single aperture of a mask as defined by a light transmissible portion as shown in Figure 5, whereas the resulting light spot is made to coincide to with the light transmissible portion (aperture) of the mask (see col. 4, lines 54-56).

Regarding claims 9, 23-24 and 31, Nishiwaki *et al.* ('250) does not teach directing the laser beam to a first reflecting surface and then a second reflecting surface that are rotating such as to invert the beam in a collinear direction. Shei *et al.* ('238) teach an optical homogenizer system including a first, second and third reflecting means (discrete members) that rotate (130) (see col.4, lines 53-57). It should be noted that because the optical homogenizer system reshapes and homogenizes the beam in a circular fashion that said homogenizer rotates. Further, it should be noted that because the optical homogenizer system of Shei *et al.* ('238) includes a similar structure as claimed, specifically three rotating reflecting surfaces placed at an angle to the incoming beam, then it is submitted that the outgoing laser beam of Shei *et al.* ('238) is inverted. Therefore, it would have been obvious for one of ordinary skill in the art to have provided an optical homogenizer system including a first, second and third reflecting means that rotate as taught by Shei *et al.* ('238) in the process of Nishiwaki *et al.* ('250) because, Shei *et al.* ('238) specifically teach that such a homogenizer reshapes and homogenizes the beam in a circular fashion, hence improving the quality of the resulting nozzles. It should be noted that the apparatus of Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) teach a nozzle plate substrate and a beam homogenizer.

6. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiwaki *et al.* (US Patent No.5,263,250) in view of Shei *et al.* (US Patent No. 5,569,238) and in further view of Daly (US Patent No. 4,316,074).

Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) teach the basic claimed process as described above.

Regarding claim 25, although Shei *et al.* ('238) teach reflective means, Shei *et al.* ('238) do not specifically teach dielectric mirrors. Daly ('074) teaches the use of high reflectance dielectric mirrors (see col. 6, lines 30-35). Therefore, it would have been obvious for one of ordinary skill in the art to have used the high reflectance dielectric mirrors of Daly ('074) in the process of Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) because, Daly ('074) teaches that such mirrors have a 99% reflectance rate, whereas the process of Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) requires reflective means for homogenizing the beam, hence improving process quality.

7. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiwaki *et al.* (US Patent No.5,263,250) in view of Shei *et al.* (US Patent No. 5,569,238) and in further view of Hizny (US Patent No. 5,048,938).

Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) teach the basic claimed process as described above.

Regarding claim 35, although Nishiwaki *et al.* ('250) does not teach the use of a second mask interposed between the first mask (8) and the beam converging lens (10), the use of multiple masks to process a laser beam is well known in the art as evidenced by Hizny ('938)

which teaches that “cleaning” of the beam occurs by using a spatial filter (mask) (see col. 1, lines 10-15). Therefore, it would have been obvious for one of ordinary skill in the art to have interposed a second mask (spatial filter) as taught by Hizny ('938) in the process of Nishiwaki *et al.* ('250) in view of Shei *et al.* ('238) because, Hizny ('938) specifically teaches that using a spatial filter (mask) allows “cleaning” of the laser beam prior to its impingement on the target, hence improving product quality and also because Hizny ('938) specifically teaches that the use of spatial filters is well known.

Allowable Subject Matter

8. Claim 34 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

9. Applicants' arguments filed May 9, 2003 (Paper No. 10) have been considered. Applicants argue that claim 9 has not been amended because it “recites that the high energy beam is directed at a *first planar reflecting surface*” (emphasis added) and that this surface is arranged so as to reflect said beam towards a “*further beam reflecting means*” and as such the “reflecting ‘means’ is interpreted to encompass... *second and third surfaces*” (see page 3 of the amendment filed May 9, 2003). In response, it is noted that claim 9 does not (emphasis added) recite a “*first planar reflecting surface*” as Applicants argue and as such it is unclear

whether two, three or more reflecting surfaces are present. As noted above, it appears that inversion of the laser beam can occur only when reflecting the laser beam off three reflecting surfaces.

Applicants argue that Shei *et al.* ('238) do not teach an "apparatus [that] includes a nozzle plate substrate" (see page 3 of the amendment filed May 9, 2003). However, this argument is drawn to a newly presented claim limitation not previously presented and has been rejected in this Office Action as set forth above.

Applicants argue that Shei *et al.* ('238) do not teach "directing the beam at a surface of a substrate for preparing or forming ink jet nozzles" (see page 3 of the amendment filed May 9, 2003). However, this argument is drawn to a functional limitation of the claimed apparatus. In a claim drawn to an apparatus, the intended use must result in a structural difference as compared to the prior art.

Applicants argue that neither "Shei nor Nishiwaki teach or suggest" the limitation of "passing the beam through a converging means before 'impingement *on the face of said nozzle plate in which said nozzle outlet is formed*'" (emphasis added) (see page 4 of the amendment filed May 9, 2003). In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Further, it should be noted that Nishiwaki *et al.* ('250) teach forming nozzles in a nozzle plate for an ink jet printer. Hence, it is submitted that the nozzle of Nishiwaki *et al.* ('250) has a taper. Applicants' assertion that Figure

3 in Nishiwaki *et al.* ('250) teaches drilling of a nozzle inlet is not substantiated because the *same laser beam* (emphasis added) forms both the nozzle inlet and the nozzle outlet and as such will have to impinge "*on the face of said nozzle plate in which said nozzle outlet is formed*" in order to result in a nozzle in a nozzle plate.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's argument that there is no suggestion to combine the references (see pages 5-6 of the amendment filed May 9, 2003), the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Nishiwaki *et al.* ('250) teach an apparatus and process for forming nozzles in a nozzle plate for an inkjet print head including, splitting a laser beam (3) into a plurality of secondary beams using a system of prisms and a flyeye lens (4), hence introducing a divergence into the secondary beams, whereas the origin of

divergence being apart from the point where beam splitting occurs (see Figure 2), followed by a process of recombining and directing the secondary beams, using a convergent lens, toward a single aperture of a mask as defined by a light transmissible portion as shown in Figure 5, whereas the resulting light spot is made to coincide to with the light transmissible portion (aperture) of the mask (see col. 4, lines 54-56). Regarding claims 9, 23-24 and 31, Nishiwaki *et al.* ('250) does not teach directing the laser beam to a first reflecting surface and then a second reflecting surface that are rotating such as to invert the beam in a collinear direction. Shei *et al.* ('238) teach an optical homogenizer system including a first, second and third reflecting means (discrete members) that rotate (130) (see col. 4, lines 53-57). It should be noted that because the optical homogenizer system reshapes and homogenizes the beam in a circular fashion that said homogenizer rotates. Further, it should be noted that because the optical homogenizer system of Shei *et al.* ('238) includes a similar structure as claimed, specifically three rotating reflecting surfaces placed at an angle to the incoming beam, then it is submitted that the outgoing laser beam of Shei *et al.* ('238) is inverted. Therefore, it would have been obvious for one of ordinary skill in the art to have provided an optical homogenizer system including a first, second and third reflecting means that rotate as taught by Shei *et al.* ('238) in the process of Nishiwaki *et al.* ('250) because, Shei *et al.* ('238) specifically teach that such a homogenizer reshapes and homogenizes the beam in a circular fashion, hence improving the quality of the resulting nozzles.

In response to applicant's argument that Shei *et al.* ('238) is nonanalogous art (see page 6 of the amendment filed May 9, 2003), it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be *reasonably pertinent to the particular*

problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Shei *et al.* ('238) teach an optical homogenizer system including a first, second and third reflecting means (discrete members) that rotate (130) (see col.4, lines 53-57). It should be noted that because the optical homogenizer system reshapes and homogenizes the beam in a circular fashion that said homogenizer rotates. Further, it should be noted that because the optical homogenizer system of Shei *et al.* ('238) includes a similar structure as claimed, specifically three rotating reflecting surfaces placed at an angle to the incoming beam, then it is submitted that the outgoing laser beam of Shei *et al.* ('238) is inverted. Furthermore, because Shei *et al.* ('238) specifically teach that such a homogenizer reshapes and homogenizes the beam in a circular fashion, it is submitted that the quality of the resulting nozzles is improved because more control of the beam shape is possible and as such of the nozzle shape.

Applicants argue that the “stated motivation or suggestion put forth in the action is incorrect and not supported by prior art” because controlling “the depth of a through-hole in an ink jet nozzle plate was not a problem facing the inventors at the time of the present invention” (see pages 6-7 of the amendment filed May 9, 2003). Further, Applicants argue that “Shei is completely unrelated to solving problems...with forming tapered holes in substrates” (see page 7 of the amendment filed May 9, 2003). First, it should be noted that a “tapered hole” has not been claimed, but merely a “nozzle” having a “nozzle outlet” and a “nozzle inlet.” Secondly, it should be noted that under MPEP §2144, it “is not necessary that the prior art suggest the combination

to achieve the same advantage or result discovered by applicant. In re Linter, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972).

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (703) 305-0396. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM and alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard D. Crispino, can be reached at (703) 308-3853. The fax phone number for this Group is (703) 305-7718.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Stefan Staicovici, PhD


7/20/03
Primary Examiner

AU 1732

July 20, 2003